Panel Scientific and Technical Review

(Note: Review comments will be anonymous, but public.)

Proposal number: 2001-F212 **Short Proposal Title: Rainbow Trout (TIE)**

1a) Are the objectives and hypotheses clearly stated?

Summary of Reviewers comments:
Yes, they are generally stated and defined clearly. However, one reviewer believes that that the scope of work section seems to refer mainly to names of reference toxicant and a generic "contaminants of concern" and that more information was needed in the scope of work of quantities, study design, statistics. Another reviewer thought the approach is systematic, logical, and likely to achieve the stated goals and objectives.

Panel Summary:
Yes, the objectives and test hypotheses are clearly stated.

1b1) Does the conceptual model clearly explain the underlying basis for the proposed work?

Summary of Reviewers comments:
One reviewer states that the conceptual model does not provide a scientific framework for hypothesis testing nor does it elaborate on the factors to be evaluated as part of the proposed investigations.

Panel Summary:
A description of the extension of work and approach has been already proven using the USEPA surrogate fish species to identify the toxicant(s) in California ambient waters. The researchers are proposing to use the new model in conjunction with rainbow trout embryo development to identify toxicity using the approach that has been proved with the fathead minnow larvae.

1b2) Is the approach well designed and appropriate for meeting the objectives of the project?

Summary of Reviewers comments:
Generally the reviewers felt the approach for conducting the proposed investigation is a logical sequence for addressing the contaminant issue as outlined in the proposal. However, several detailed concerns were expressed which should be recorded.

The proposed approach assumes that contaminants within various tributaries to the mainstem Sacramento River occur at sufficient concentrations and duration to result in significant mortality and adverse population level impacts to salmon and steelhead. The major salmonid hatcheries within the system (those located on Battle Creek, the Feather River, and the American River) are sites proposed for ambient water sampling and testing under the proposed investigation. Salmon, steelhead, and in some instances rainbow trout are spawned, eggs incubated, and juveniles reared in these hatcheries. One reviewer was not aware of evidence suggesting significant contaminant-

related mortality within these hatcheries, which utilize ambient water supplies from the various watersheds. These observations appear to conflict with the notion that there is substantial mortality occurring in key spawning areas within many of these major tributaries.

The proposal does not address episodic events (e.g., stormwater runoff) in the experimental design.

Since many of the key species including fall-run and late fall-run Chinook salmon and steelhead spawn during the fall and winter months, while winter-run Chinook salmon spawn during the summer months, will a consistent supply of rainbow trout eggs be available for use in testing ambient water conditions from various portions of the watershed throughout the year?

Another reviewer commented that although the overall steps are described and types of tests are named (e.g., RTED or TIE), the experimental design, methods, data analysis and interpretation are not clearly described or integrated to show how the results would come together and show whether or not the method has been successfully developed or toxicity identified. Further, there are no off-ramps in case a step proves end-point. Further, the reviewer saw no discussion of how applicable results for trout embryos from an unspecified source are to wild salmonid responses to potential toxicants.

Panel Summary:
The panel agreed with many of the reviewer comments. Additionally, the panel felt that the investigators have successfully used the surrogate species and TIE procedure for lab and field procedures. The determination of spatial and temporal sampling and testing should have been more clearly defined (e.g. frequency and spatial intervals of sampling and analyses are often not defined).

1c1) Has the applicant justified the selection of research, pilot or demonstration project, or a full-scale implementation project?

Summary of Reviewers comments:
Yes. The proposal and contained discussion on this subject is consistent with the objectives of the SRWP.

Panel Summary:
Yes, the justification is made.

1c2) Is the project likely to generate information that can be used to inform future decision making?

Summary of Reviewers comments:
One reviewer states that, "the research would also be useful as a management tool if results clearly demonstrate that toxicity is not a significant factor adversely impacting salmonid reproductive success." Based on the currently available information there is no basis for evaluating the likelihood that the investigation will produce information to support these management decisions. Another reviewer states that, "it may generate more useful information on streams where toxicity

has been observed. However, this is a research project and by its very nature the results and their utility are unpredictable."

Panel Summary:
The project can generate information based on surrogate fathead minnow and has previously been used by water-quality managers to set TMDLs. In the current format, the toxicity tests would be more sensitive to detecting toxicity. Because of the vagaries in the methods, it is not clear that future decision-making will benefit from this work.

2a) Are the monitoring and information assessment plans adequate to assess the outcome of the project?

Summary of Reviewers comments:
One reviewer stated that "if there is a weakness in this proposal, it is only the lack of specificity on sample collection, methods and locations".

Another reviewer comments on the fact that toxicity tests rely on tests conducted under laboratory conditions, results provide valuable information on potential risk, however, the extrapolation of these results to assess population-level risk under field conditions is difficult.

Panel Summary:
What data or statistics will be used to determine the spatial and temporal toxicity? Some members agreed with one of the reviewers that extrapolation of laboratory tests to provide implications for field population dynamics must be derived without over-interpretation. Other panel members felt that the proposal does not claim to estimate field population dynamics. However, using the rainbow trout test is one step closer to determining the possible contaminants of concern to salmon species.

2b) Are data collection, data management, data analysis, and reporting plans well-described, scientifically sound and adequate to meet the proposed objectives?

Summary of Reviewers comments:
One reviewer states that "the information appears to be scientifically sound and includes a number of points of peer review for the development of protocols, in addition to the ongoing oversight of a technical sub-committee. The proposal includes a QA/QC program, in addition to other standard protocols for ensuring that the results will be technically sound and adequate to meet the proposed objectives. Another reviewer states that, "data collection, management, and analyses would obviously occur but are not described."

Panel Summary:
Although possibly specified in the references cited (i.e., the method cited) the statistical methods and sampling schedule are not specified in the proposal.

3) Is the proposed work likely to be technically feasible?

Summary of Reviewers comments:
One reviewer states that "the ability to effectively interpret and extrapolate results from the laboratory investigations to field conditions is a major technical challenge that will affect feasibility of interpreting and utilizing data from this research investigation for making management decisions." However, the scope of work, if feasible, can be accomplished using the methods and approach outlined in the scope. Another reviewer states that, "the researchers can probably determine whether the approach is useful". However, whether the team can determine toxicity and causative agents for all locations remains to be seen.

Panel Summary:
Experience of the research team indicates that the proposed work is feasible. Application of digital imaging technology should have been more fully described in the proposal.

4) Is the proposed project team qualified to efficiently and effectively implement the proposed project?

Summary of Reviewers comments:
Yes. The team is knowledgeable and experienced with the techniques. However, it is not clear what roles and responsibilities regarding the scope, schedule, budget, and quality, of the Regional Board, AQUA-Science, UCD and the SRWP. Another reviewer, states the project team has extensive experience in conducting laboratory-based toxicity tests and evaluating the effects of various pollutants and contaminants.

Panel Summary:
No question that the researchers are experienced and qualified. The team has experience in demonstrated applications of toxicity testing results to the identification of specific toxicants in California ambient waters.

5)Other comments

One reviewer rated this proposal as excellent and "the proposal could be very useful in better defining the role of urban runoff and other point and non-point sources of contaminants and toxicants affecting California's anadromous fisheries." Two other reviewers rated the proposal as "good". One of these two reviewers stated that, "If the proposal is funded, I recommend that milestones and budgets be established, to allow the research to proceed in a phased manner, with the first phase being development of the testing protocol and its validation prior to proceeding with any further field testing."

The differences between the reviewer ratings may be explained by the different expertise level. For example, one reviewer may not have understood that the rainbow trout embryo development method has been developed and in fact has been used to determine toxicity in some ambient waters as cited in the literature.

Overall Evaluation
PANEL SUMMARY COMMENTS

The team of researchers is well experienced and has demonstrated success with using the fathead minnow larval test to determine contaminants in ambient waters and therefore, list waters as needing to develop regulatory TMDLs. Also, the proposal uses the rainbow trout species and endpoint that has already been developed and used to determine toxicity. This panel rating is contingent upon clarification of Task 7, with respect to the roles of UCD and Aquascience. The panel felt that the difference between reviewer ratings was due to a lack of understanding of the reviewer that rated it lower.

Summary Rating
Excellent
Very Good
Good
Fair
Poor

Your Rating: VERY GOOD